

BLACKMER HYDRIVE - HYDRAULIC COOLER

INSTALLATION, OPERATION, AND MAINTENANCE INSTRUCTIONS WITH PARTS LISTS

Discontinued models - parts availability may be limited.

968899

INSTRUCTIONS AND PARTS LIST NO. 287-787/A

Section | 200 - 700

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SAFETY DATA

The Blackmer Hydrive **MUST** only be installed in systems which have been designed by qualified engineering personnel. The system **MUST** conform to all applicable local and national regulations and safety standards.

This manual is intended to assist in the installation and operation of the Blackmer Hydrive, and **MUST** be kept with the Hydrive.

Blackmer Hydrive service shall be performed by qualified technicians **ONLY**. Service shall conform to all applicable local and national regulations and safety standards.

Thoroughly review this manual, all instructions and hazard warnings, **BEFORE** performing any work on the Blackmer Hydrive.

Maintain **ALL** system and Blackmer Hydrive operation and hazard warning decals.

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This is a SAFETY ALERT SYMBOL.

When you see this symbol on the product, or in the manual, look for one of the following signal words and be alert to the potential for personal injury, death or major property damage.

▲ DANGER

Warns of hazards that **WILL** cause serious personal injury, death or major property damage.

▲ WARNING

Warns of hazards that **CAN** cause serious personal injury, death or major property damage.

▲ CAUTION

Warns of hazards that **CAN** cause personal injury or property damage.

NOTICE:

Indicates special instructions which are very important and must be followed.

TECHNICAL DATA

Blackmer recommends that the Hydrive hydraulic system be kept within these guidelines. Do not exceed the maximum operating limits listed below.

	NORMAL	MAXIMUM
Oil Flow Rate	15 - 26 U.S. GPM (57 - 100 LPM)	32 U.S. GPM (120 LPM)
Circuit Pressure	750 - 3000 psi (5171 - 20,684 kPa)	4500 psi (31,000 kPa)
Fan Speed	2000 - 2800 RPM	3600 RPM
Return Pressure	15 - 50 psi (103 - 345 kPa)	100 psi (689 kPa)
Heat Dissipation	13 HP (9.75 kW)	21 HP (15.75 kW)
Fan Motor Flow	2 U.S. GPM (7.5 LPM)	2.5 U.S. GPM (9.45 LPM)

NOTE: Allowance should be made for the Hydrive to use 2 U.S. gpm (7.5 lpm) of the pump flow to drive the fan motor.

HYDRAULIC CIRCUITS

Figure 1 shows the hydraulic circuits for a single motor drive system. If driving a motor in both directions, a direction valve should be fitted into the circuit as shown.

The Hydrive is NOT suitable for use with hydraulic cylinders.

NOTE: The use of bulkhead fittings is recommended to prevent any overstressing of the hoses and connections between the tractor and trailer.

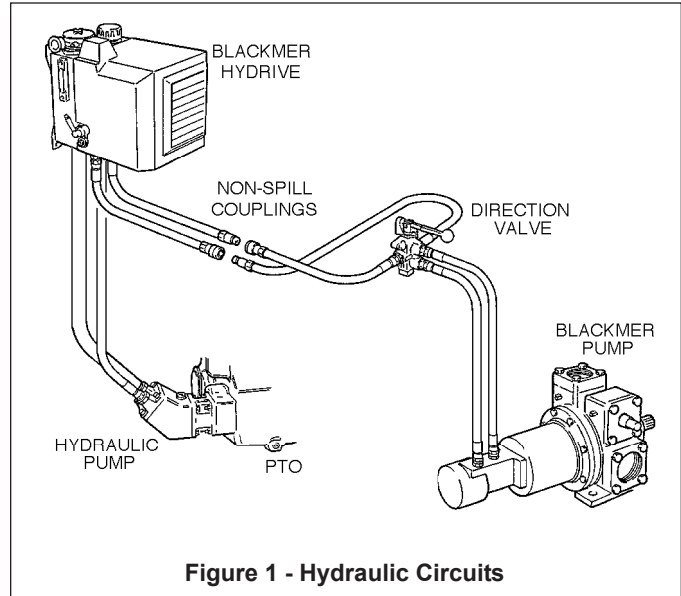
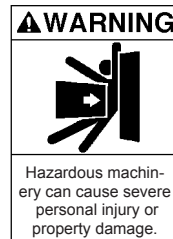


Figure 1 - Hydraulic Circuits

INSTALLATION

NOTICE: THE BLACKMER HYDRIVE MUST ONLY BE INSTALLED IN SYSTEMS DESIGNED BY QUALIFIED ENGINEERING PERSONNEL. SYSTEM DESIGN MUST CONFORM WITH ALL APPLICABLE REGULATIONS AND CODES AND MUST PROVIDE WARNING OF ALL SYSTEM HAZARDS.



SET THE VEHICLE EMERGENCY BRAKE AND CHOCK WHEELS BEFORE ATTEMPTING MAINTENANCE OR SERVICE.

MOUNTING THE HYDRIVE

1. Position the Hydrive so that the filler cap, sight glass and ON/OFF valve are all accessible, and that the cooling points are not restricted (see Figure 2). Do not obstruct the front of the Hydrive (where air exits).
2. Rigidly mount the Hydrive using all four mounting holes, do not put any strain on the tank fabrication or distort the mounting lugs. The Hydrive must be mounted as high above the hydraulic pump as possible to avoid hydraulic pump cavitation.
3. The Hydrive should be mounted away from the wheels and road spray to protect the radiator from impact damage from stones and loose hoses etc. (See Figure 3, page 3.)
4. Make provision to place test equipment in discharge line of Hydrive. (See Figure 6, page 5.)

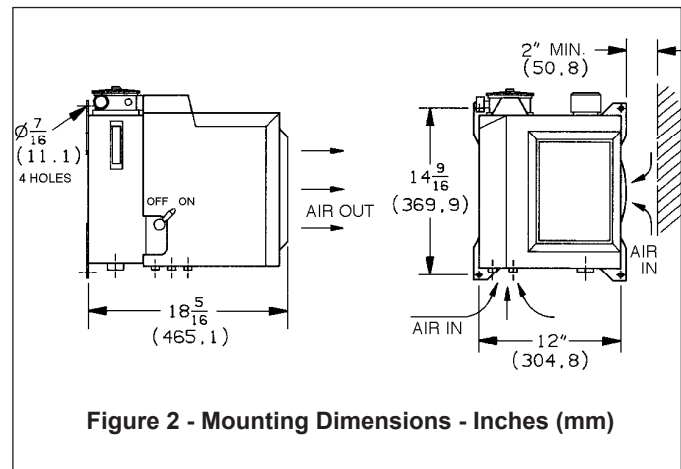


Figure 2 - Mounting Dimensions - Inches (mm)

INSTALLATION

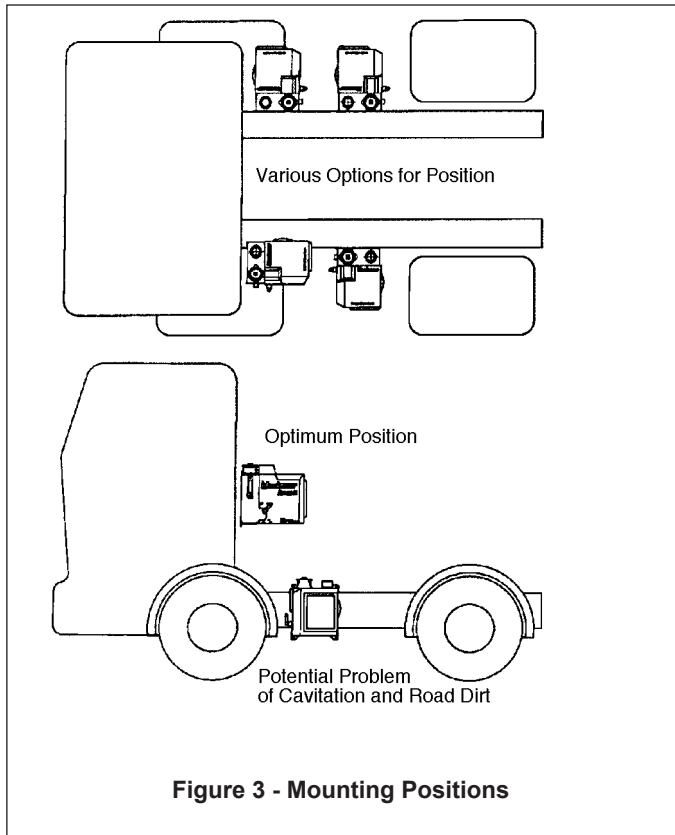


Figure 3 - Mounting Positions

REMOTE OPERATION OF HYDRIVE CONTROL VALVE

DO NOT modify the ON/OFF valve handle by the addition of a cable, wire or other extension devices. If the Hydrive control valve is inaccessible, two types of remote control valves are available from Blackmer (p/n 209.347 or 209.348). These supplement the unit valve and can be positioned in a more accessible location. The control valves are operated by hand or electrically. Refer to Figure 4 for installation.

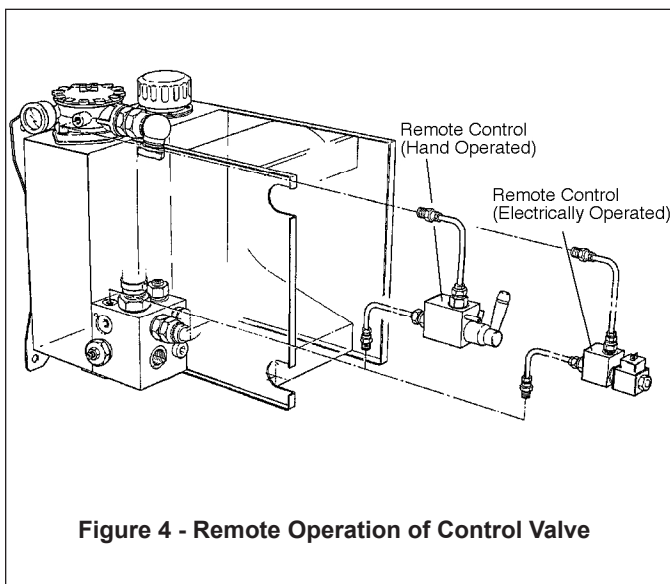


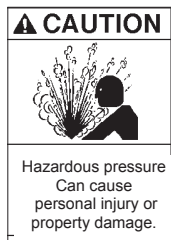
Figure 4 - Remote Operation of Control Valve

CONNECTING THE HYDRIVE

1. The recommended suction hose for the Hydrive is a steel wire reinforced, low pressure suction hose. For pump flows up to 15 U.S. gpm (57 lpm) use 1½" bore hose. Use 2" bore hose for flows up to 30 U.S. gpm (114 lpm). Connect the suction hose from the 1½" NPT male fitting on the Hydrive to the hydraulic pump using suitable hose fittings (hose tails) and two hose clamps (jubilee clips) on each end (see Figure 5, Item 1). Do not put any strain on the tank fittings. The suction pipe must be kept as short as possible, without any tight bends or kinks, and must be completely air tight.

DO NOT loosen or remove the 1½" NPT adapter 051.035 as the suction filter is attached inside the tank.

2. All hoses MUST be connected to the control block via bulkhead fittings, to avoid any stress being put onto the block. The bracket for the bulkhead fittings must be fixed to the same structure to which the Hydrive is anchored (frame, cab, trailer, etc.).
3. Pressure and return hoses must be connected using pressure (swagged) type fittings, installed to the hose manufacturer's recommendations.
4. All seals must be made using bonded washers, O-ring or coned fittings. Blackmer does not recommend the use of PTFE tape or liquid sealants, as these may contaminate the hydraulic oil or plug the system.
5. Connect the ¾" high pressure hose from the hydraulic pump to the 1¹⁄₁₆" JIC male fitting stamped "pump" on the valve block via the bulkhead fitting (Fig. 5, Item 2). Insure that this hose will withstand the operating pressures required.



SYSTEM FITTINGS AND HOSES MUST BE CAPABLE OF WITHSTANDING OPERATING PRESSURES.

6. Some hydraulic pumps and motors require a drain line to return to the Hydrive tank. In this instance, remove the Hydrive tank drain plug and connect the drain pipe to the ½" BSP female connection (Fig. 5, Item 5).
7. Connect a ¾" high pressure hose from the 1¹⁄₁₆" JIC fitting on the control valve block stamped "motor" to the intake of the hydraulic motor via the bulkhead fitting (Fig. 5, Item 4). Insure this hose will withstand the operating pressure required.
8. Connect the low pressure return hose from the drive motor to the 1¹⁄₁₆" JIC male fitting stamped "return" on the valve block via the bulkhead fitting. A return hose, rated for 300 psi (2,068 kPa) working pressure, is recommended (Fig. 5, Item 4).
9. On tractor/truck and semi trailer mounted applications, the pipes to the drive motor should be connected by quick

INSTALLATION

release (non-spill) couplings. To reduce back pressure on the motor, it is recommended that one size larger couplings be used on the return line.

NOTICE: QUICK RELEASE COUPLINGS MUST BE PROTECTED FROM CONTAMINATION AND DAMAGE AND BE PROPERLY CLEANED BEFORE RE-CONNECTION.



QUICK RELEASE COUPLINGS MUST BE FULLY CONNECTED. FAILURE TO DO SO CAN CAUSE PERSONAL INJURY OR PROPERTY DAMAGE.

waste hydraulic oil. Properly dispose of waste hydraulic oil.

3. Thoroughly flush the entire system, refilling the Hydrive reservoir as necessary, until free of all contamination.
4. Reconnect the Hydrive return hose.

PRIMING THE SYSTEM



SET THE VEHICLE EMERGENCY BRAKE AND CHOCK WHEELS BEFORE ATTEMPTING MAINTENANCE OR SERVICE.

Hazardous machinery can cause severe personal injury or property damage.

BEFORE engaging the PTO follow these steps:

1. Fill the tank with the recommended hydraulic oil, until the oil reaches the black mark in the sight glass.
2. Make sure the Hydrive control handle is in the OFF position.
3. Non-spill (dry-break) couplings (if fitted) must be fully connected. Failure to do so can damage the hydraulic motor seals.
4. If selector valve or reverse valve is fitted, select neutral.

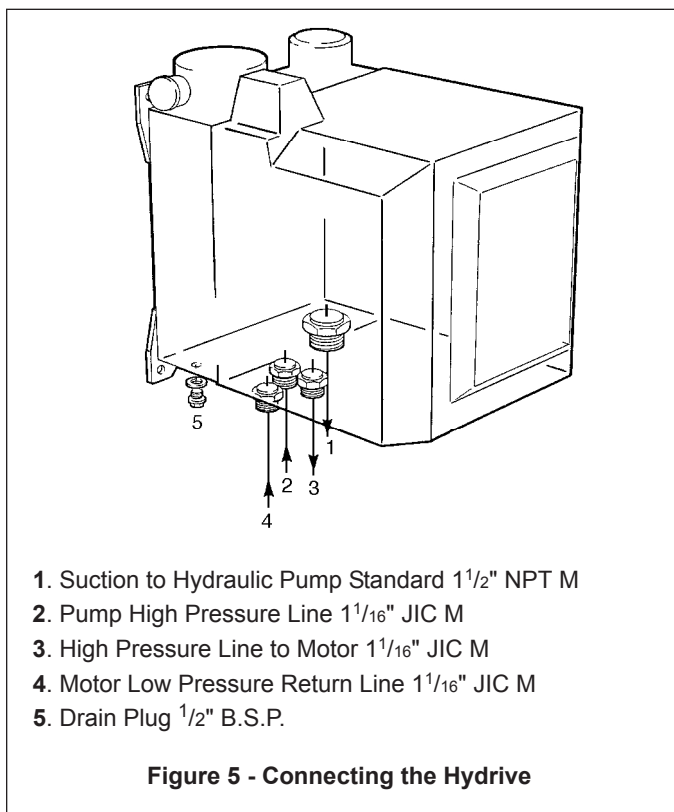
WARNING: SET THE VEHICLE EMERGENCY BRAKE AND CHOCK WHEELS BEFORE ATTEMPTING MAINTENANCE OR SERVICE.

5. Have a container of suitable hydraulic oil available to refill the Hydrive reservoir as necessary. DO NOT overfill.
6. Make sure the driven cargo pump (or compressor) is vented and cannot develop pressure.

Priming the System

NOTICE: THE SUBSEQUENT SYSTEM PRIMING INSTRUCTIONS MUST BE FOLLOWED TO AVOID ENTRAPPING AIR.

1. Depress the clutch and engage the PTO. Release the clutch slowly. After approximately two seconds depress the clutch and disengage the PTO.
2. To insure that all system components, hoses and fittings are completely filled with hydraulic oil, crack the Hydrive return connection at the Hydrive control valve block allowing any trapped air to escape.
3. During the priming procedure, insure that the hydraulic oil does not drop below the RED mark on the Hydrive sight glass.
4. Operate any system selector and reversing valves to insure that all hoses and fittings are free of air.
5. Repeat steps 1 through 4 until system is fully primed.
6. Secure the Hydrive control valve block return connection.



1. Suction to Hydraulic Pump Standard 1 1/2" NPT M
2. Pump High Pressure Line 1 1/16" JIC M
3. High Pressure Line to Motor 1 1/16" JIC M
4. Motor Low Pressure Return Line 1 1/16" JIC M
5. Drain Plug 1/2" B.S.P.

Figure 5 - Connecting the Hydrive

HYDRAULIC OIL

The system must be filled with one of the following antifoaming hydraulic oils, or an equivalent oil:

- BP - ENERGOL HLP32
- SHELL - TELLUS 32
- CASTROL - HYPIN AWS 32
- ESSO - NUTO-H 32

All hoses, fittings and the Hydrive tank should be flushed with hydraulic oil, prior to filling the Hydrive tank with hydraulic oil, using the following procedure:

1. Fill the Hydrive oil reservoir with suitable hydraulic oil (see examples above).
2. Disconnect Hydrive return hose at the Hydrive control valve block and provide a suitable container to collect

INSTALLATION

Engaging Hydraulic Motor

1. Position the selector valve or reverse valve (if fitted) for desired system operation.
2. Move Hydrive ON/OFF valve to the ON position.
3. Increase tractor engine rpm to the required operating speed.

NOTICE: DO NOT OVERSPEED THE TRACTOR ENGINE, AS THIS WILL CAUSE SERIOUS DAMAGE TO THE SYSTEM COMPONENTS.

4. Inspect the hydraulic system for leaks. If any leaks are present, shut down the system immediately and repair as necessary. Then return to "Priming the System" section of this manual.
5. Following the procedure provided in the "Setting and Adjusting Fan Speed" section of this manual, check the Hydrive fan to verify factory setting.
6. Using an optical tachometer, check the speed of the driven unit.

NOTICE: THE HYDRIVE MUST BE FREE OF VIBRATION, HYDRAULIC OR MECHANICAL, WHEN IN OPERATION, OR SERIOUS DAMAGE TO HYDRIVE COMPONENT PARTS WILL OCCUR.

7. On engine-driven pump arrangements, insure the engine speed is governed to prevent overspeeding of the driven unit(s).

CAUTION INCORRECT SETTINGS OF THE PRESSURE RELIEF VALVE CAN CAUSE SYSTEM COMPONENT FAILURE, PERSONAL INJURY AND PROPERTY DAMAGE.



SETTING & ADJUSTING HYDRIVE RELIEF VALVE

The Hydrive is fitted with a pressure relief valve that is factory set. Standard Hydrive units (p/n 208.503) are set at 2,500 psi (17,241 kPa). High Pressure Hydrive units (p/n 208.510) are set at 3,000 psi (20,690 kPa). Insure that the appropriate Hydrive setting is functional with all ancillary equipment. **DO NOT** exceed lowest system component pressure rating or 4,500 psi (31,034 kPa). **ALWAYS** use an appropriately sized, calibrated pressure gauge when adjusting the pressure relief valve. *The equipment required includes: 17mm wrench and 5mm hex socket key.*

Setting Hydrive Relief Valve with Only a Tachometer:

1. Run the system components at normal operating conditions.
- NOTICE: The hydraulic system pressure MUST be at normal operating pressure. This is the load pressure either actual or simulated.**
2. To adjust the pressure setting, loosen the pressure relief valve locknut by turning it *counterclockwise*. Turn the adjusting screw *counterclockwise* until the driven unit(s) speed decreases.
 3. Turn the pressure relief valve *clockwise* until the driven unit(s) speed no longer increases, then turn an additional 1/4 turn.
 4. Tighten locknut.

Setting Hydrive Relief Valve with Test Equipment (Fig. 6):

1. Install test equipment in "motor" pipe line per the manufacturers recommendations. NOTE: The use of quick connect fittings in the motor pipe line makes for easier adjustment of the relief valve.
2. With the system operating, the Hydrive control valve ON, the driven unit(s) under NO load, and the selector valve (if equipped) in NEUTRAL, loosen the pressure relief valve locknut by turning it *counterclockwise*, then turn the adjusting screw one full turn *clockwise*.
3. Turn the tester load valve *clockwise*, increasing the test pressure, until a pressure 10% ABOVE the required operating pressure is obtained.
4. Turn the Hydrive pressure relief screw *counterclockwise* until a decrease in pressure is seen on the tester. Note the pressure at this point.
5. Tighten the pressure relief valve locknut, rechecking that the pressure on the tester has not exceeded the pressure in step 4. If pressure has changed, repeat steps 2 through 4 until desired pressure is obtained.
6. Turn OFF the system, bleed OFF all pressure, and remove the test equipment. Reinstall the high pressure line.
7. Following steps 1 through 6 in the "Priming the System" section of this manual, refill and expel any trapped air.
8. If the Hydrive pressure relief valve is set above the recommended 2,500 psi, follow steps 1 through 4 of "Setting and Adjusting Hydrive Fan Speed."

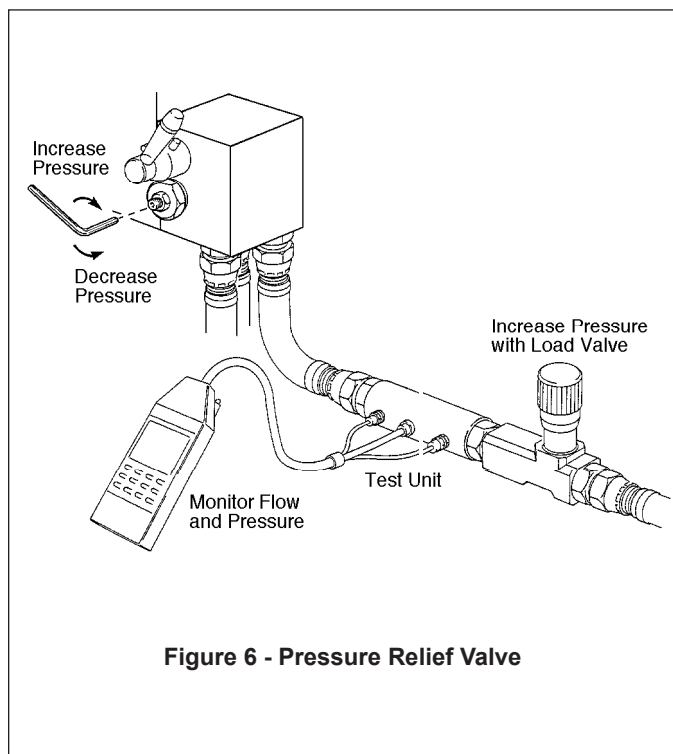
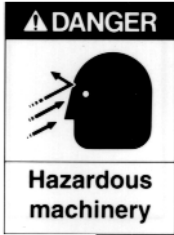


Figure 6 - Pressure Relief Valve

INSTALLATION

SETTING & ADJUSTING HYDRIVE FAN SPEED



FAN SPEED ABOVE 3,600 RPM WILL CAUSE SERIOUS PERSONAL INJURY OR MAJOR PROPERTY DAMAGE.

The Hydrive fan speed is factory set. Standard Hydrive units are set at 2800 RPM. High Pressure Hydrive units are set at 3,400 RPM. **NOTE: The fan will not reach rated speeds without adequate system pressure.** Fan speed may be adjusted to control the Hydrive operating temperature. *The equipment required includes: optical tachometer, extended 4mm hex socket key and a 13mm wrench.* (See Figure 7.)

NOTICE: System components MUST be operating at FULL load to properly set the Hydrive fan speed.

1. Operate hydraulic system at full load to properly set Hydrive fan speed. **NOTE:** Creating an artificial load of the factory relief valve setting, either 2,500 psi (17,241 kPa) or 3,000 psi (20,690 kPa) is the best way to set the fan speed. Refer to Setting & Adjusting Hydrive Relief Valve (page 5) if necessary.
2. Loosen the fan speed locknut by turning *counterclockwise*.
3. While constantly checking the fan speed with an optical tachometer, increase the fan speed by turning the adjusting screw *counterclockwise*. Decrease the fan speed by turning *clockwise*. (See Figure 7.)

CAUTION: Fan speed adjustment is very sensitive. Total fan speed adjustment range is approximately 1/4 turn.

4. When desired fan speed is obtained, tighten the locknut by turning it *clockwise*.
5. Turn Hydrive control valve to OFF position.
6. Turn Hydrive control valve to ON position and recheck the fan speed. Readjust if necessary.

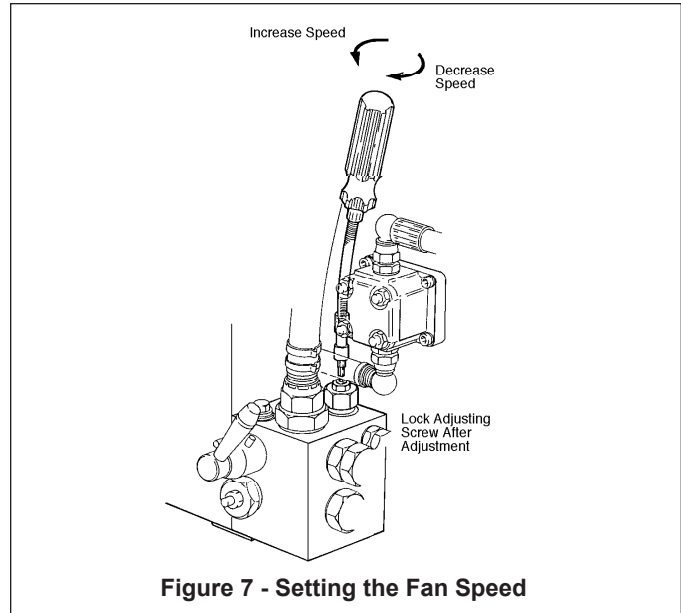


Figure 7 - Setting the Fan Speed

OPERATION



SET THE VEHICLE EMERGENCY BRAKE AND CHOCK WHEELS BEFORE ATTEMPTING MAINTENANCE OR SERVICE.

HYDRIVE PRE-START UP CHECK LIST

1. Check the Hydrive oil tank to make sure it is full of clean, uncontaminated oil, and that the level is no lower than the red mark in the sight glass.

CAUTION



QUICK RELEASE COUPLINGS MUST BE FULLY CONNECTED. FAILURE TO DO SO CAN CAUSE PERSONAL INJURY OR PROPERTY DAMAGE.

2. Check the radiator for obstructions and dirt. Clean as necessary.
3. Set the Hydrive ON/OFF valve to OFF, and the selector valve (if equipped) to NEUTRAL.

HYDRIVE OPERATION

1. Set the tractor speed to idle RPM, depress the clutch and engage the PTO. Release the clutch **SLOWLY**.
2. When equipped, set the selector valve and reverse valve(s), as required.
3. **SLOWLY** set the Hydrive ON/OFF valve to ON. Only minimal handle operating pressure should be required.
4. Set the tractor RPM to the required speed to obtain desired system operation. **DO NOT** overspeed the Blackmer pump.
5. Inspect system for hydraulic oil leaks and for Hydrive fan operation. If leaks or incorrect fan operation are observed, shut down the system immediately. Repair as necessary.
6. When system operation has been stabilized, check the Hydrive operating temperature gauge, located on the tank sight glass, for the recommended maximum temperature of 180°F (82°C). To adjust the Hydrive fan speed and system operating temperature, follow the instructions given in the "Setting and Adjusting Hydrive Fan Speed" section (above.)
7. To avoid damaging pressure spikes, **SLOW** operation of the Hydrive ON/OFF valve is recommended.
8. The Hydrive control valve **MUST** be in the OFF position before moving the selector and reversing valve(s), if the system is so equipped.

MAINTENANCE

NOTICE: BLACKMER HYDRIVE SERVICE SHALL BE PERFORMED BY QUALIFIED TECHNICIANS ONLY. SERVICE SHALL CONFORM TO ALL APPLICABLE LOCAL AND NATIONAL REGULATIONS AND SAFETY STANDARDS.

▲WARNING



Hazardous machinery can cause severe personal injury or property damage.

SET THE VEHICLE EMERGENCY BRAKE AND CHOCK WHEELS BEFORE ATTEMPTING MAINTENANCE OR SERVICE.

Before any work is performed on the Hydrive, the cover should be removed and the unit thoroughly steam cleaned to remove all traces of dirt. Make certain that water or vapor does not enter the system during the cleaning process.

MAINTENANCE SCHEDULE

After the First 10 Hours of Operation

1. Inspect hydraulic system for hydraulic oil leaks. If leaks are observed, shut down the system immediately and repair as necessary.
2. Replace the Hydrive return filter (p/n 052.033). Inspect the Hydrive suction filter (p/n 052.001), and replace as necessary, following the instructions provided in this manual.
3. Inspect all Hydrive anchor bolts, fittings and hoses. Tighten and replace as necessary.
4. Check the Hydrive fan speed and relief valve setting. Adjust as required, following the instructions in this manual.

Every Three Months

1. Follow ALL instructions in the "After the First 10 Hours of Operation" section.
2. When the Hydrive hydraulic oil is cold, the oil restriction gauge indication may drop from the GREEN to the RED level. After the Hydrive comes up to operating temperature, the oil restriction reading MUST return to the GREEN level. If the reading fails to return to the GREEN level, the return filter (p/n 052.033) MUST be replaced, following the instructions in this manual.
3. Inspect the Hydrive suction filter (p/n 052.001) for damage or dirt. Replace as necessary.
4. Inspect the Hydrive radiator and fan for damage. Carefully clean with air or steam. DO NOT remove the fan blade balancing clips.

Every Six Months

1. Follow ALL instructions provided in the "Every Three Months" section of this manual.

2. Replace ALL Hydrive filters following the instructions provided in the filter replacement sections of this manual.

Every Twelve Months

1. Follow ALL instructions provided in the "Every Three Months" section of this manual
2. Replace hydraulic oil following the instructions provided in the "Hydraulic Oil" and "Priming the Hydrive System" sections of this manual.

HYDRIVE RETURN FILTER REPLACEMENT

The return filter should be checked at least every three months and replaced every six months. (See Figure 8.)

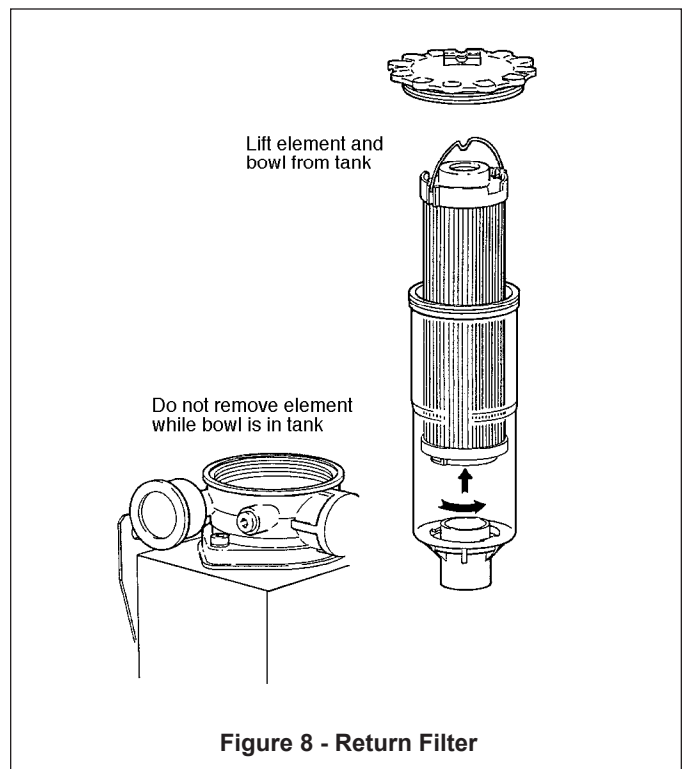


Figure 8 - Return Filter

1. Unscrew the Hydrive return filter cap, turning it *counterclockwise*. Remove cap.
2. Lift the filter element *and* bowl assembly straight out. Rocking the element may assist in removal. **DO NOT** twist the filter element while the bowl is in the hydraulic tank. Properly dispose of used hydraulic oil.

NOTICE: DO NOT REMOVE THE FILTER ELEMENT FROM THE BOWL WHILE THE BOWL IS IN THE HYDRIVE TANK. THIS WILL CONTAMINATE ALL HYDRAULIC OIL IN THE TANK.

3. Remove and properly discard the old filter element by a 1/4 *counterclockwise* turn. Filter element CANNOT be cleaned or reused.
4. Install new return filter element (p/n 052.033), with a 1/4

MAINTENANCE

- clockwise* turn, insuring that the element is fully installed in the bowl.
- Place bowl and filter assembly into the filter housing, and with a new O-ring installed (p/n 702280), carefully install the filter cap by turning *clockwise* until hand tight. DO NOT overtighten cap.
 - Refill the hydraulic oil following the instructions in the "Hydraulic Oil" and "Priming the Hydrive" sections.

HYDRIVE FILLER STRAINER CLEANING AND SUCTION FILTER REPLACEMENT

- Completely drain the hydraulic oil from the Hydrive tank by removing the tank drain plug, located on the underside of the Hydrive tank. Properly dispose of hydraulic oil.
- Inspect the suction filler strainer, and when cleaning is required, remove the suction filler cap, then the six capscrews holding the cap. Lift out the suction filler strainer and gasket assembly. Clean the strainer and the suction filler gasket area and reinstall the gasket and strainer assembly securely with the six capscrews. (See Figure 9.)
- Disconnect the pipe leading into the return filter cap housing.
- Remove the two socket head capscrews and washers holding the return filter housing assembly to the Hydrive tank. Lift out the complete return filter assembly from the tank.
- Reach into the tank through the filter return hole and unscrew the suction filter from inside the Hydrive tank by turning it *counterclockwise* (see Figure 9). Inspect the suction filter for debris or damage. The filter may be cleaned with an appropriate solvent and brush. If the filter element is damaged, replace it (p/n 052.001). Dispose of the solvent and damaged filter element properly.

NOTICE: FOLLOW THE SOLVENT MANUFACTURER'S INSTRUCTIONS REGARDING USE AND DISPOSAL.

- Install the cleaned or replaced suction filter by turning *clockwise*, until hand tight.
- After cleaning the return filter gasket area of debris, reinstall the return filter housing assembly and gasket, securely fastening it with the two socket head capscrews and washers. Replace the return filter element with a new filter (p/n 052.033).
- Reconnect the pipe leading into the return filter cap housing.
- Refill with hydraulic oil following the instructions in the

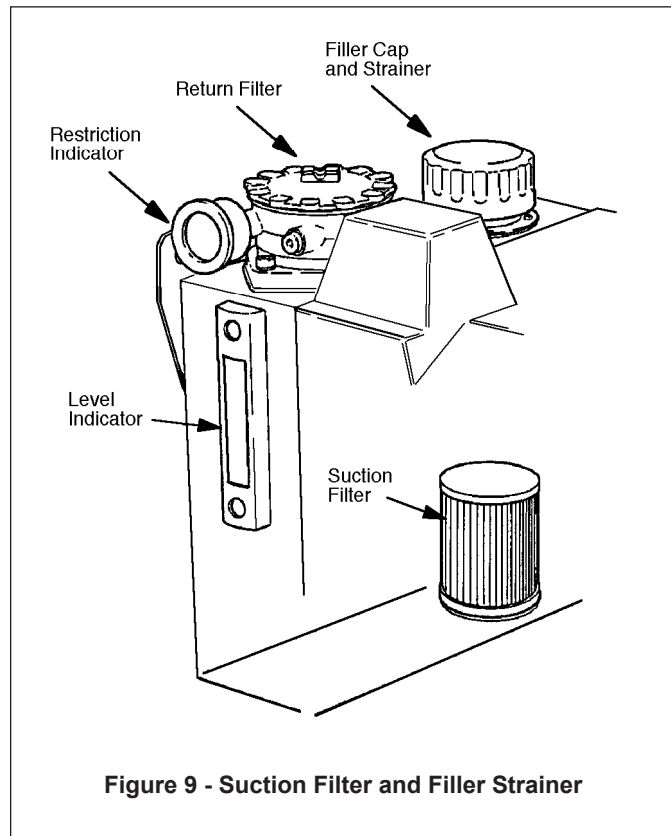


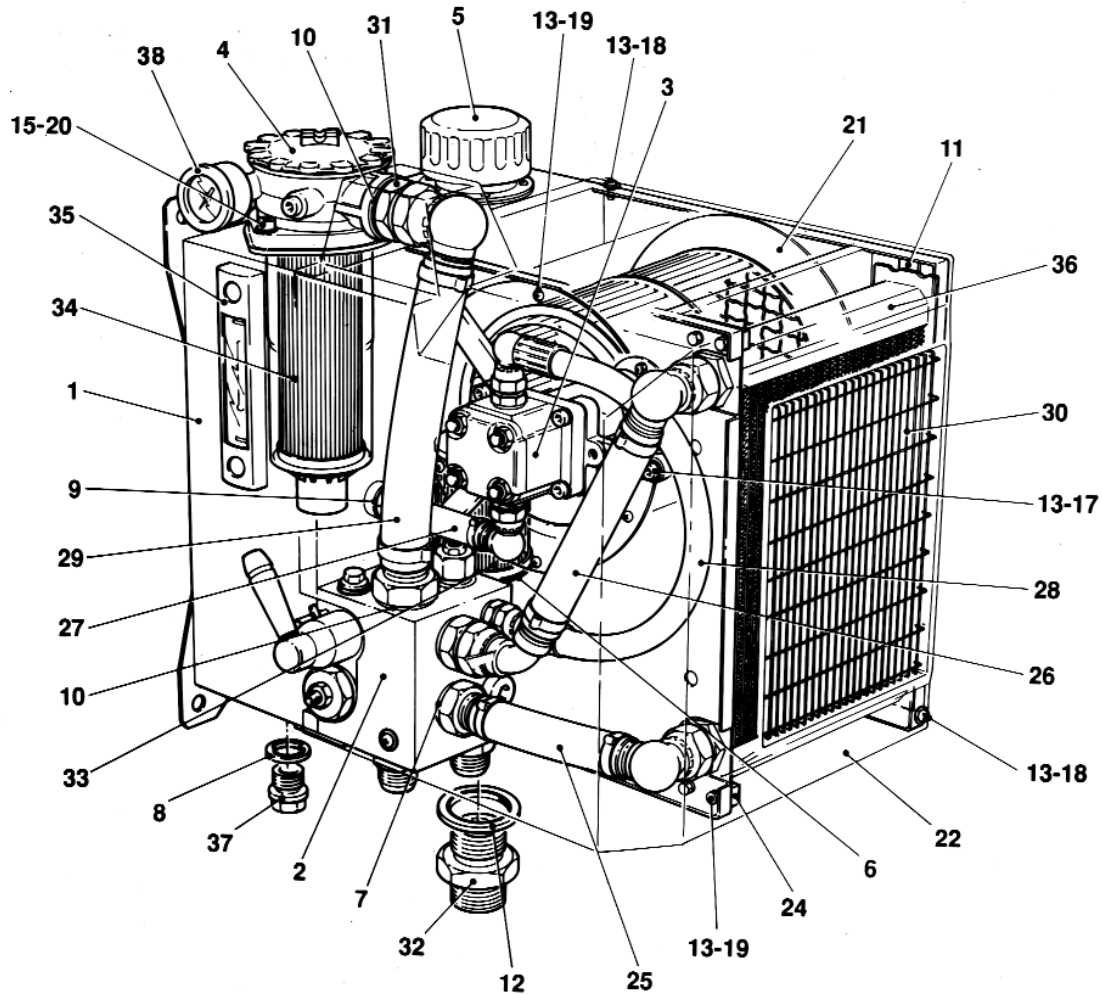
Figure 9 - Suction Filter and Filler Strainer

NOTES

HYDRIVE TROUBLESHOOTING

PROBLEM	CAUSE	CORRECTIVE ACTION
<p>NOISY See Cause - 1, 2, 3, 4, 5, 6</p>	<p>1. Cavitation See Corrective Action - A, B, C, D, E</p>	<p>A. Refill, Replace Hydraulic Oil</p>
<p>OIL MILKY / FOAMS See Cause - 1, 2, 3, 4, 5, 6</p>	<p>2. Incorrect Tractor or Blackmer Hydraulic Pump Speed See Corrective Action - E</p>	<p>B. Replace Damaged or Too Small Suction Line</p>
<p>LOW SYSTEM PRESSURE See Cause - 1, 3, 4, 5, 6</p>	<p>3. Dirty or Damaged Suction Filter See Corrective Action - C</p>	<p>C. Clean or Replace Suction Filter</p>
<p>HIGH RETURN PRESSURE See Cause - 7, 8</p>	<p>4. Worn or Damaged Hydraulic Pump, Hydrive Fan Motor See Corrective Action - F</p>	<p>D. Adjust Relief Valve Setting or Replace Relief Valve</p>
<p>RADIATOR FAILURE See Cause - 9, 10</p>	<p>5. Pressure Relief Valve Faulty, Sticking or Incorrect Setting See Corrective Action - D</p>	<p>E. Adjust Tractor or Blackmer Pump Speed</p>
<p>EXCESSIVE SYSTEM TEMPERATURE See Cause - 2, 4, 5, 10, 11</p>	<p>6. Low Hydraulic Oil See Corrective Action - A, H</p> <p>7. Dirty or Damaged Return Filter See Corrective Action - G</p> <p>8. Hydraulic Return Line Restrictions See Corrective Action - G, H</p> <p>9. Hydraulic System Pressure Spikes See Corrective Action - D, J, K</p> <p>10. Dirty or Damaged Radiator See Corrective Action - L</p> <p>11. Incorrect Fan Speed See Corrective Action - F, L, M</p>	<p>F. Inspect, Repair, Replace Hydraulic Motor, Hydrive Fan Motor</p> <p>G. Replace Return Filter</p> <p>H. Repair or Replace Return Line(s)</p> <p>J. Selector Valve Operated Too Quickly or While System was Under Pressure; or Selector Valve not Equipped with Open Center – Change Selector Valve if necessary.</p> <p>K. Install Blackmer Accumulator Assembly</p> <p>L. Clean, Repair or Replace Radiator</p> <p>M. Adjust Fan Speed</p>

PARTS LIST - HYDRIVE



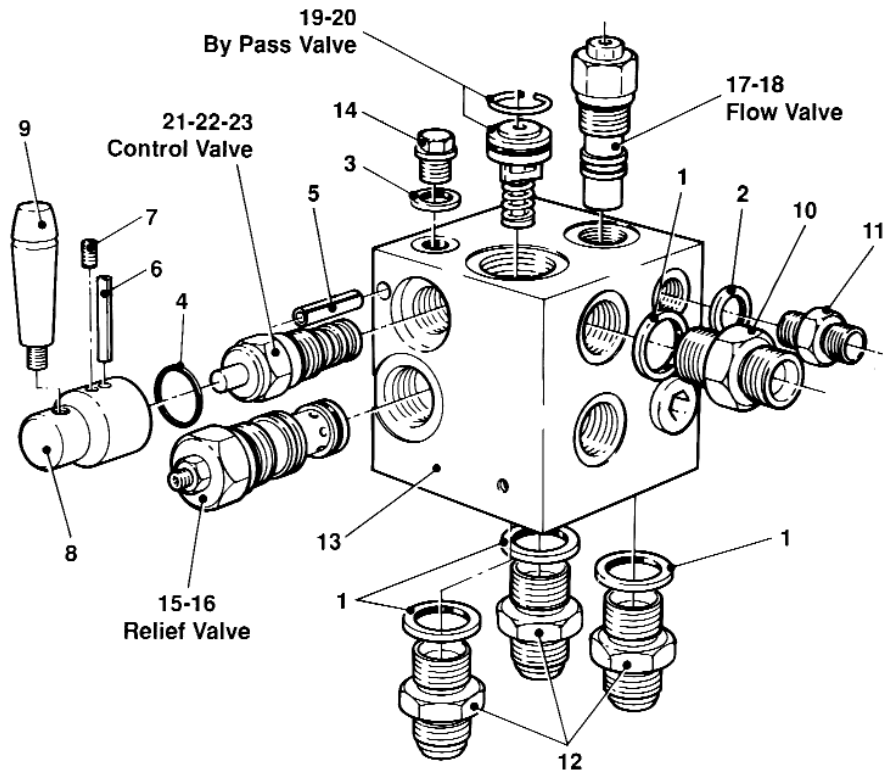
REF. NO.	DESCRIPTION	QTY.	PART NO.	REF. NO.	DESCRIPTION	QTY.	PART NO.
1	Tank Assembly	1	209.501	22	Cover	1	029.035
2	Valve Block Assembly	1	209.504	-	Name Plate	1	037.001
3	Fan Drive Assembly	1	209.500	24	Plate	2	037.032
4	Return Filter Assembly ¹	1	209.505	25	Radiator Inlet Pipe Assembly	1	040.045
5	Filler Cap & Strainer ²	1	009.044	26	Radiator Outlet Pipe Assembly	1	040.046
6	O-Ring	1	711924	27	Motor Outlet Pipe Assembly	1	040.048
7	Seal (3/4")	1	018.021	28	Motor Inlet Pipe Assembly	1	040.049
8	Seal (1/2")	1	018.022	29	Return Filter Pipe Assembly	1	040.094
9	Seal (3/8")	1	018.023	30	Wire Mesh Guard	1	044.010
10	Seal (1")	2	018.034	31	1" x 1" BSP M & M Adapter	1	051.046
11	Rubber Strip	5 ft.	018.037	32	1-1/2" BSP x 1-1/2" JIC M & M Adapter	1	051.035
12	Seal (1-1/2")	1	018.046	33	Suction Filter	1	052.001*
13	Washer (M6)	14	023.015	34	Return Filter Element	1	052.033*
15	Washer (M8)	2	023.027	35	Sight Glass	1	052.006
-	Name Plate Screw	2	024.015	36	Radiator	1	052.008
17	SOC Capscrew (M6 x 25mm)	3	024.030	37	1/2" BSP Plug	1	055.041
18	Screw (M6 x 20mm)	3	024.176	38	Restriction Indicator	1	049.008
19	Hex Capscrew (M6 x 16mm)	14	024.093	-	O-Ring Return Filter Cover	1	702280
20	Capscrew (M8 x 30mm)	2	024.111	-	O-Ring Bowl	1	711941
21	Cowl Inlet Guard	1	026.007				

* Part Number Denotes Repair Kit.

¹ Bowl Not Available Separately.

² Available as Assembly Only.

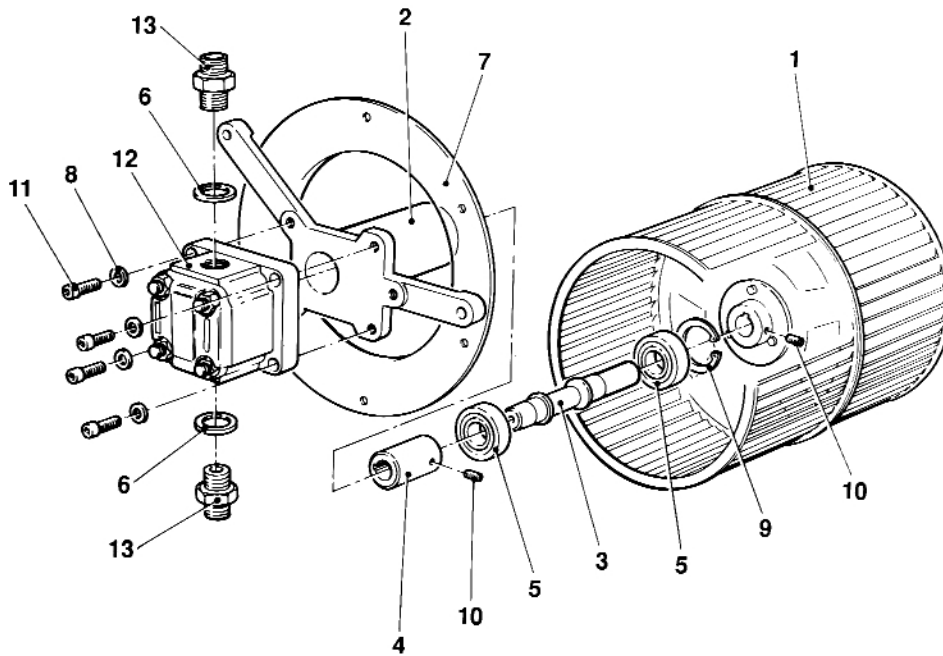
PARTS LIST - VALVE BLOCK



REF. NO.	DESCRIPTION	QTY.	PART NO.	REF. NO.	DESCRIPTION	QTY.	PART NO.
1	Seal (3/4")	4	018.021	13	Valve Block Assy. with Valves	1	052.007
2	Seal (3/8")	1	018.023	14	Plug 1/4" BSP	1	055.003
3	Seal (1/4")	1	018.024	15	Relief Valve with Seals	1	052.011*
4	O-Ring	1	018.036	16	Relief Valve Seal Kit	1	018.040*
5	Stop Pin	1	022.005	17	Flow Valve with Seals	1	052.012*
6	Pin	1	022.009	18	Flow Valve Seal Kit	1	018.038*
7	Setscrew (M6 x 10)	1	024.078	19	Bypass Valve with Seals	1	052.013*
8	Handle Body	1	035.006	20	Bypass Valve Seal Kit	1	018.039*
9	Handle	1	035.007	21	Control Valve with Seals	1	052.021*
10	Adapter 3/4" BSP	1	051.003	22	Control Valve Seal Kit	1	018.038*
11	Adapter 3/8" BSP	1	051.005	23	Control Valve – Complete Assy.	1	209.410*
12	Adapter 3/4" BSP – 1-1/16" JIC	3	051.044				

* Part Number Denotes Repair Kit.

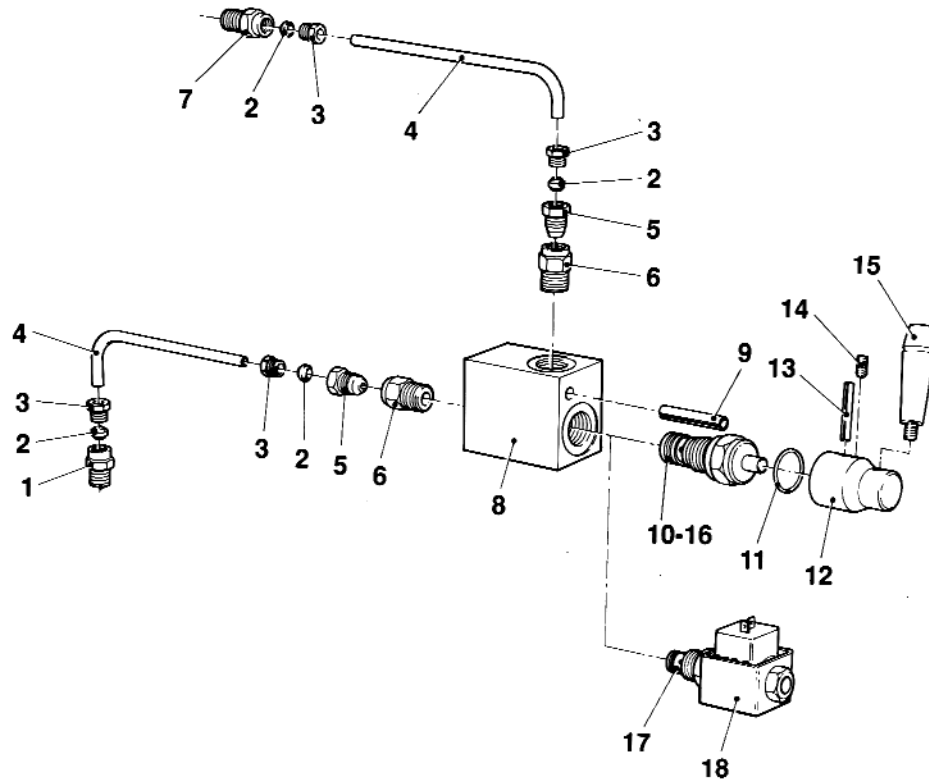
PARTS LIST - FAN ASSEMBLY



REF. NO.	DESCRIPTION	QTY.	PART NO.
1	Fanwheel Assembly	1	025.018
2	Body Spider	1	007.013
3	Shaft	1	012.028
4	Coupling	1	016.079
5	Bearings	2	017.011
6	Seal (3/8")	2	018.023
7	Inlet Ring	1	026.008
8	Washer (M6)	4	023.015
9	Circlip	1	023.024
10	Setscrew	2	024.078
11	Screw (M6 x 25mm)	4	024.030
12	Hydraulic Motor	1	046.034
13	Adapter 3/8"	2	051.005
-	Spider Assembly	1	209.503*

* Part Number Denotes Repair Kit.

PARTS LIST - REMOTE CONTROLS

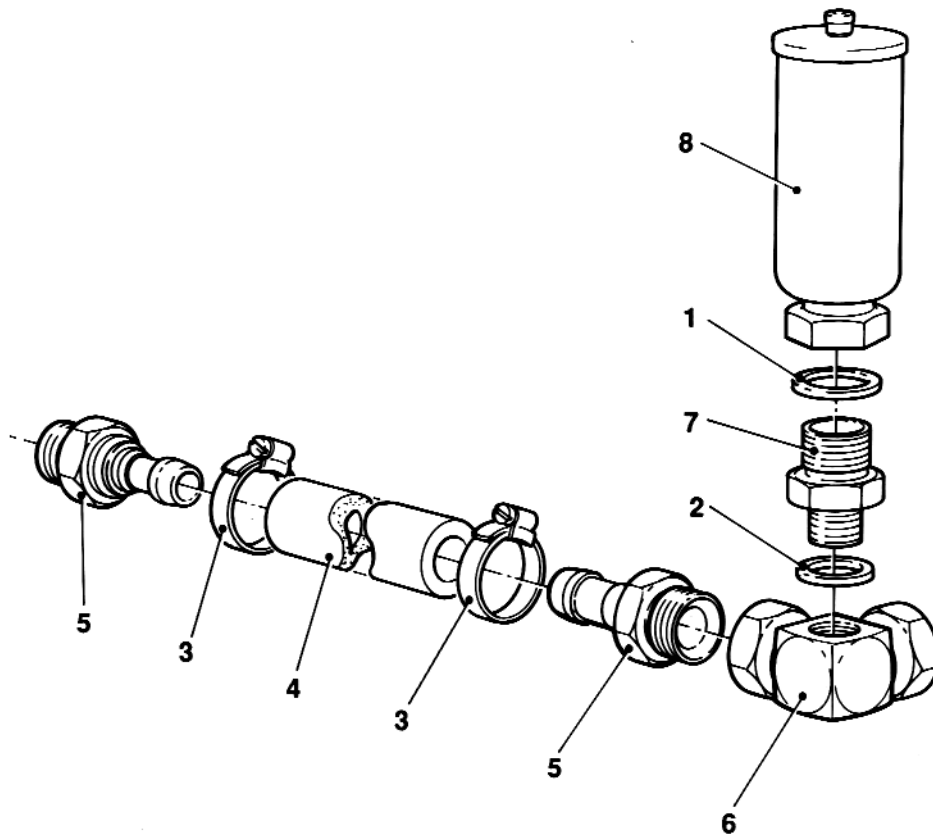


REF. NO.	DESCRIPTION	QTY.	PART NO.
–	Electrical Control	–	209.347
1	Adapter	1	055.011
2	Ferrule	4	055.007
3	Tubing Nut	4	055.009
4	Copper Pipe	4 ft.	040.006
5	Reducer	2	055.058
6	Adapter	2	055.062
7	Adapter	1	055.046
8	Remote Valve Block	1	052.029
17	Solenoid Valve	1	052.025
18	Coil 24V	1	052.026

REF. NO.	DESCRIPTION	QTY.	PART NO.
–	Mechanical Control	–	209.348
1	Adapter	1	055.011
2	Ferrule	4	055.007
3	Tubing Nut	4	055.009
4	Copper Pipe	10m	040.003
5	Reducer	2	055.059
6	Adapter	2	055.063
7	Adapter	1	055.046
8	Remote Valve Block	1	052.016
9	Stop Pin	1	022.005
10	Control Valve with Seals	1	052.021
11	O-Ring Seal	1	018.036
12	Handle Body	1	035.006
13	Pin	1	022.009
14	Setscrew (M6 x 10mm)	1	024.078
15	Handle	1	035.007
16	Control Valve Seal Kit	2	018.038*

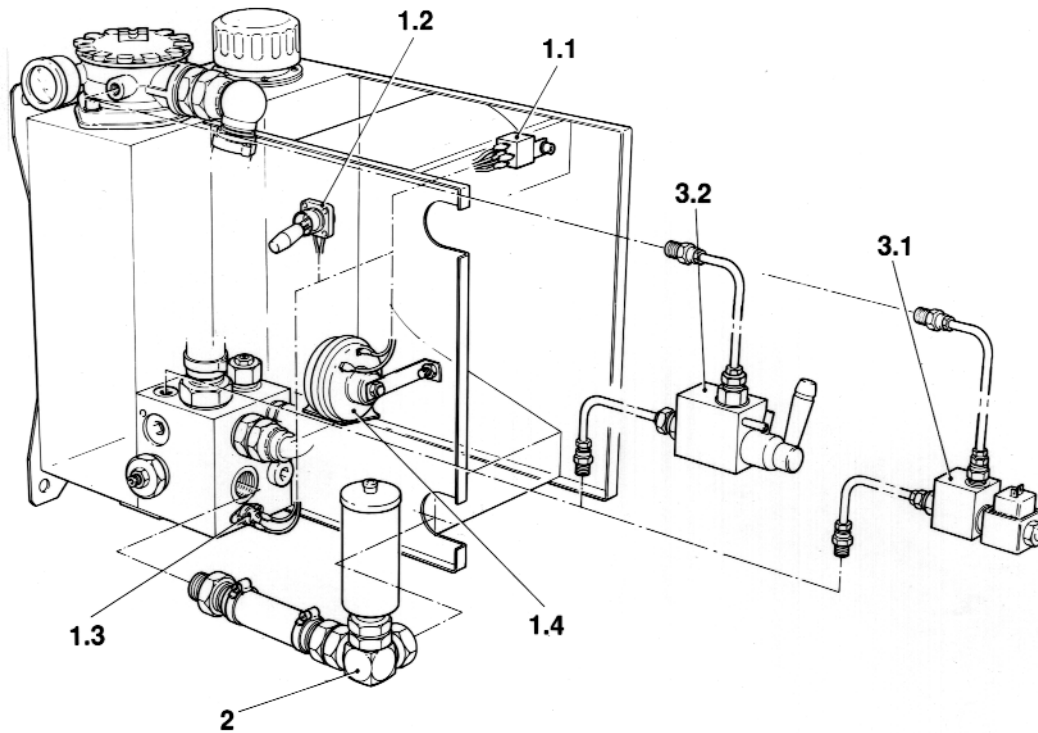
* Part Number Denotes Repair Kit.

PARTS LIST - ACCUMULATOR



REF. NO.	DESCRIPTION	QTY.	PART NO.
1	Seal (3/4")	1	018.021
2	Seal (1/2")	1	018.022
3	Hose Clamp	2	023.034
4	Pipe	1	040.071
5	Hose End Fitting	2	051.030
6	Accumulator Adapter Elbow	1	051.042
7	Adapter	1	051.043
8	Accumulator	4	052.024

PARTS LIST - ANCILLARY EQUIPMENT



REF. NO.	DESCRIPTION	QTY.	PART NO.
—	Tank Level/High Temp. Alarm	1	209.141
1.1	Relay Switch	1	033.001
1.2	Float Switch	1	033.002
1.3	Temperature Switch*	1	033.003
1.4	Horn	1	033.004
2	Accumulator Assembly	1	209.330
3.1	Remote Control (Solenoid Op.)	1	209.347
3.2	Remote Control (Hand Op.)	1	209.348

*Standard on High Pressure Hydrive 208.510.



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